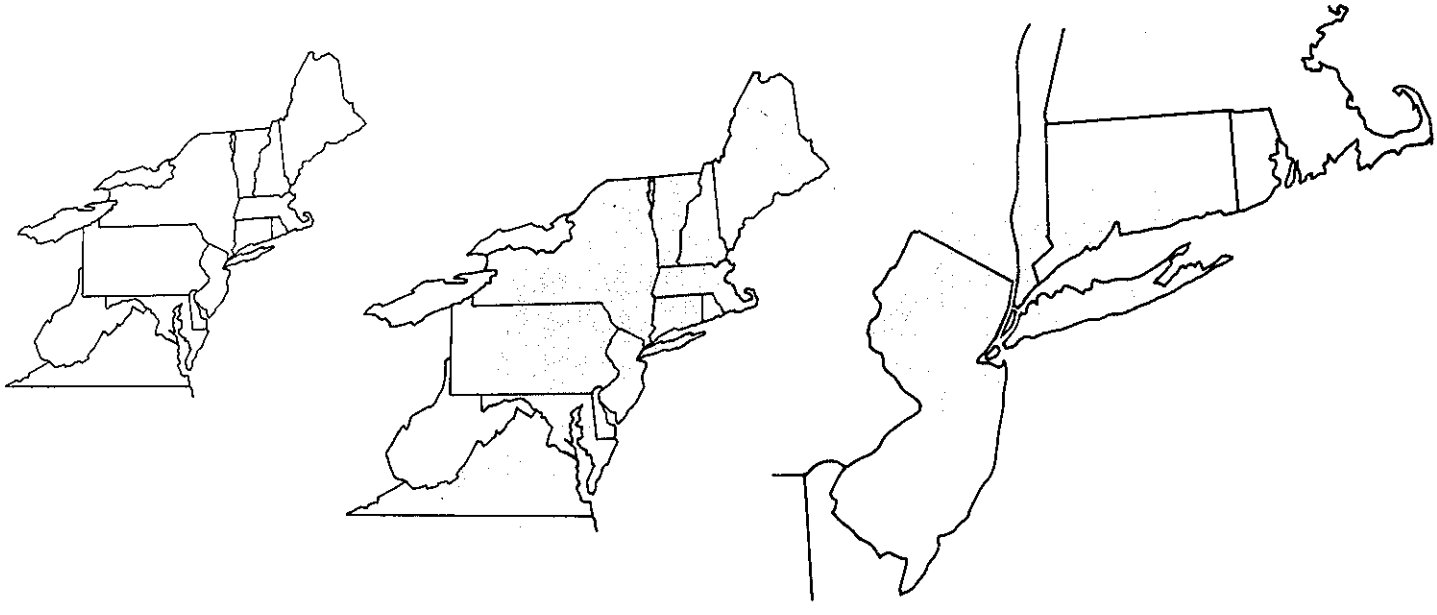
NORTHEASTERN UNITED STATES WATER SUPPLY STUDY

REGIONAL WATER SUPPLY; INSTITUTIONAL AND COST SHARING OPTIONS



JUNE 1973

REGIONAL WATER SUPPLY:
INSTITUTIONAL AND COST-SHARING OPTIONS

ERRATA

p. 40 -- Under ". New York", third dash mark, third line, "HO-1; HO-4; C-1" should be "HO-4; LI-2a; HU-1".

Following ". New York", insert:

. Connecticut

- The development on the upper Housatonic River would suffice through the year 2000.

- By 2020 additional water would be drawn from the Connecticut River. (Projects included are: HO-1; HO-4; C-1).

p. 41 -- Dash-marked paragraph at top of page is amended to read:

- Nassau and Suffolk Counties would need to negotiage an agreement providing for the use of Suffolk ground water by Nassau.

p. 43 -- Under ". Connecticut", second dash mark, fifth line, "HM-1" should be "HU-1".

DEPARTMENT OF THE ARMY
NORTH ATLANTIC DIVISION, CORPS OF ENGINEERS
90 CHURCH STREET
NEW YORK, N. Y. 10007

IN REPLY REFER TO

NADPL-S

NOTICE

This report is one in a series of studies to be undertaken in connection with the Northeastern United States Water Supply Study authorized under Public Law 89-298, and assigned to the Division Engineer, North Atlantic Division, U.S. Army Corps of Engineers, for accomplishment.

The report develops a series of alternative institutional options for the implementation of regional water supply programs for the New York Study Area, and analyzes the legal and institutional requirements for the implementation of seven illustrative regional programs developed in a previous study. The application of two of the institutional options to one of the regional programs is demonstrated. An analysis is made of the objectives of cost-sharing and of alternative options for cost-sharing of water supply programs, and these options are illustratively applied to a modified version of one of the regional water supply programs. Finally, optional federal and state government roles in establishing interconnections, leakage control, and metering are developed.

The institutional and cost-sharing options described in this report are being appropriately considered in the study of regional water supply for the northern New Jersey-New York City-western Connecticut metropolitan region.

NORTHEASTERN UNITED STATES WATER SUPPLY STUDY

LEGAL, INSTITUTIONAL AND COST SHARING REQUIREMENTS FOR IMPLEMENTING WATER SUPPLY PROJECTS

IN THE

NORTHERN NEW JERSEY NEW YORK CITY
WESTERN CONNECTICUT
METROPOLITAN AREA

JUNE 1973

NORTH ATLANTIC DIVISION, U.S. ARMY CORPS OF ENGINEERS
CONTRACT NO. DACW 52-73-C-0008

BOOZ, ALLEN PUBLIC ADMINISTRATION SERVICES, INC.

BOOZ • ALLEN PUBLIC ADMINISTRATION SERVICES, Inc.
1025 Connecticut Avenue, N. W.
Washington D.C. 20036
(202) 293-3600

June 29, 1973

Major General R. H. Groves
Division Engineer
North Atlantic Division
Corps of Engineers
Department of the Army
90 Church Street
New York, New York 10007

RE: Contract No. DACW 52-73-C-0008

Dear General Groves:

The attached report contains our findings and conclusions as to legal, institutional, and cost-sharing requirements for the implementation of water supply projects and programs in the northern New Jersey-New York City-Western Connecticut metropolitan area.

The findings and conclusions have been developed over the course of an 11-week period as part of the overall Northeastern United States Water Supply (NEWS) Study.

As requested, the report focuses on the presentation of balanced institutional and cost-sharing options rather than presenting any specific recommendations. The options that appear most viable, however, are identified.

The report is presented in summary outline format, as requested, and completes our work under Contract No. DACW-52-73-C-0008. We have found this to be a stimulating and challenging assignment. We look forward to working with you again.

Very truly yours,

Booz, Allen
Public Administration Services, Inc.

PREFACE

NORTHEASTERN UNITED STATES WATER SUPPLY STUDY (NEWS)

During the major drought in the northeastern part of the United States in the early 1960's, the Congress recognized that the Federal Government had a major role to play in the solution of water supply problems.

The 89th Congress enacted Public Law 89-298 on October 27, 1965. Title I thereof authorized the Secretary of the Army, acting through the Chief of the Army Corps of Engineers, to cooperate with the various Federal, state, and local agencies in the preparation of plans to meet the long-term water needs of the northeastern United States. (A copy of the Title I legislation is shown in Exhibit I, following this page.)

Specific features of the legislation related to this study include the provision that the plans developed "may provide for the construction, operation and maintenance by the United States of a system of major reservoirs" and that "such plans shall provide for appropriate financial participation by the states, political subdivisions thereof, and other local interests."

EXHIBIT I

Corps of Engineers
Department of the Army

Public Law 89-298
89th Congress, S. 2300
October 27, 1965

An Act

Authorizing the construction, repair, and preservation of certain public works on rivers and harbors for navigation, flood control, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

TITLE I—NORTHEASTERN UNITED STATES WATER SUPPLY

SEC. 101. (a) Congress hereby recognizes that assuring adequate supplies of water for the great metropolitan centers of the United States has become a problem of such magnitude that the welfare and prosperity of this country require the Federal Government to assist in the solution of water supply problems. Therefore, the Secretary of the Army, acting through the Chief of Engineers, is authorized to cooperate with Federal, State, and local agencies in preparing plans in accordance with the Water Resources Planning Act (Public Law 89-80) to meet the long-range water needs of the northeastern United States. This plan may provide for the construction, operation, and maintenance by the United States of (1) a system of major reservoirs to be located within those river basins of the Northeastern United States which drain into the Chesapeake Bay, those that drain into the Atlantic Ocean north of the Chesapeake Bay, those that drain into Lake Ontario, and those that drain into the Saint Lawrence River, (2) major conveyance facilities by which water may be exchanged between these river basins to the extent found desirable in the national interest, and (3) major purification facilities. Such plans shall provide for appropriate financial participation by the States, political subdivisions thereof, and other local interests.

(b) The Secretary of the Army, acting through the Chief of Engineers, shall construct, operate, and maintain those reservoirs, conveyance facilities, and purification facilities, which are recommended in the plan prepared in accordance with subsection (a) of this section, and which are specifically authorized by law enacted after the date of enactment of this Act.

(c) Each reservoir included in the plan authorized by this section shall be considered as a component of a comprehensive plan for the optimum development of the river basin in which it is situated, as well as a component of the plan established in accordance with this section.

Under authorization of this Act, the Corps of Engineers, North Atlantic Division, has established a NEWS Study Group, which has conducted a series of studies to determine the water supply needs of the area, to identify alternative water supply projects to meet these needs, and to identify institutional and cost-sharing options relative to Federal, state, and local efforts required for the implementation of the water supply projects.

The following report examines the institutional and cost-sharing options applicable to the New York-New Jersey-Connecticut part of the study area.

TABLE OF CONTENTS

I. INSTITUTIONAL OPTIONS FOR MANAGING WATER SUPPLY DEVELOPMENT

I. INSTITUTIONAL OPTIONS FOR MANAGING WATER SUPPLY DEVELOPMENT

This chapter presents our findings on the existing institutional and legal arrangements for water supply allocation and development in New York, New Jersey, and Connecticut and represents our conclusions regarding possible institutional options.

The chapter has five parts:

- Description of existing institutional and legal arrangements
- Objectives of institutional arrangements
- Institutional options
- Institutional and legal implementation requirements regardless of option selected for each of the seven engineering programs as outlined in the Joint Venture Report*
- Illustrative application of the Local Initiative/Federal Planning and State/Federal Leadership institutional options to Program G

The first part--a description of existing institutional and legal arrangements--is based on our interviews with 40 state and local

*Alternative Regional Water Supply Plans for Northern New Jersey-New York City-Western Connecticut Metropolitan Area, Metcalf and Eddy/Hazen and Sawyer, under contract number DACW-52-69-C-0001, November 1971.

officials and public and private water suppliers in the 3 states. A list of persons interviewed is shown in the Appendix.

The second and third parts--objectives and institutional options--build on the findings presented in the report done by the Institute for Public Administration (IPA).* We have reviewed the objectives and restated the supporting rationale and have modified the statement of some options, based on our interview findings as to changes that would make the options more workable. We have also assessed the advantages of each option in terms of its likelihood of achieving the stated objectives.

The fourth and fifth parts--institutional and legal implementation requirements and the illustrative application of the Local Initiative/Federal Planning option and the State/Federal Leadership option--represent our judgment and evaluation of both the IPA report and the results of our interviews.

1. DESCRIPTION OF EXISTING INSTITUTIONAL AND LEGAL ARRANGEMENTS

Present institutional and legal arrangements for water supply development and allocation are focused on the state level. Because

*Organizational, Legal, and Public Finance Aspects of Regional Water Supply, Institute for Public Administration under contract number DACW-52-69-C-0002, July 1972.

New York City is a major component of the entire institutional and legal framework for water supply, it is discussed separately.

(1) New York City

Institutional

The New York City Board of Water Supply, established in 1905 by New York State Statute, is responsible for ascertaining when new sources of supply are required by the City. It is also responsible for designing and constructing such new sources, including basic distribution facilities, after obtaining the approval of the State and the Board of Estimate of the City. The Board of Water Supply is composed of three commissioners, appointed by the Mayor for life terms, and the Administrator of the Environmental Protection Administration (ex officio).

The Department of Water Resources within the City's Environmental Protection Administration bears responsibility for the operation, maintenance, and distribution of the water supply constructed by the Board of Water Supply. Under the distribution function, the Department is responsible for constructing all secondary distribution facilities.

Legal

Under the provisions of New York City Administrative Code, Title K, Chapter 51 (Section 42.0), the City is required to supply the 8 upstate counties through which its water supply passes.

The City's use of the Delaware River is governed by a U. S. Supreme Court decree of 1931 and a subsequent decision in 1954. Under the former, New York City was permitted to construct the Rondout, Neversink, and Pepacton Reservoirs as part of the Delaware River system. Withdrawals from the river were limited to 400 million gallons per day (mgd), however, and certain releases to the main river were required. Under the latter decision, New York City was allowed to construct the Cannonsville Reservoir, withdrawing 800 mgd from the Delaware, but release obligations were incrementally increased.

(2) New York State

Institutional

There are 602 municipal and investor-owned water supply companies in the New York State area of the NEWS study. For the most part, they serve relatively unimportant roles

in terms of the quantity of water delivered and the number of customers served. One major exception is the Spring Valley Water Company, a wholly owned subsidiary of the Hackensack Water Company of New Jersey, which served approximately 60% of the residents in Rockland County, New York. Other major private companies are:

- Jamaica Water Supply Company
- Long Island Water Corporation
- Utilities and Industries Corporation
- New Rochelle Water Company

At the State government level since 1970, the Department of Environmental Conservation (DEC) has been the principal department concerned with water supply. The DEC is mandated by State Statute to perform the following functions:

- Planning, developing, and managing the State's water resources
- Allocating water for public water supply systems
- Reviewing health aspects of water supply and establishing standards of quality and purity during all planning stages
- Investigating completed projects
- Undertaking regional studies for the preservation, conservation, development, and use of water resources within the State
- Controlling well-drilling on Long Island
- Managing river regulation and improvement during planning stages

- Establishing flood control and floodplain management

The Department of Health has primary responsibility for the quality and control of existing public water supplies from the standpoint of public health and environmental concern. In cooperation with the DEC, it also reviews and approves plans for public water supply systems. The Department of Health also initiates and coordinates studies for municipal and inter-municipal water supply facilities known as Comprehensive Public Water Supply Studies and Report (CPWS), authorized by Article V, Part V-A of the State's Conservation Law.

The Office for Local Government performs studies relating to the improvement of existing water supply facilities in cooperation with the DEC.

The Public Service Commission regulates rates of all private water supply companies operating within the State.

Various other departments play highly specialized roles in the total water resources management picture.

The Temporary State Commission on the Water Supply Needs of Sourtheastern New York was created by Chapter 593 of the Law of 1969. According to the First Year Report of the Commission, the Commission was directed to: "determine

the long range water supply needs of the metropolitan area including New York City and eight suburban counties, evaluate available water resources and facilities, develop specific alternatives both technical and managerial to meet needs, and make recommendations based on needs, cost, administration, and environmental impact." The Commission, which is composed of 15 members appointed by the Governor, the Temporary President of the Senate, and the Speaker of the Assembly, is to make its final report and recommendations by December 15, 1973, and to expire on March 31, 1974.

Legal

The State is legally responsible for the allocation of water resources, the review of completed water resource projects, and the supervision of public health aspects of water supply projects.

The State Constitution requires that any reservoirs in the Adirondack State Park be constructed, owned, controlled, and operated by the State. Such reservoirs cannot require more than 3% of the Park's lands.

If State financing is required for any new project, the legislature must vote on a bond issue; if approved, it must be subject to a referendum.

(3) New Jersey

Institutional

There are 90 local water supply systems in the northeastern New Jersey area encompassed by the NEWS study. Some systems are municipally owned and operated; some are operated by State-authorized, multi-jurisdictional commissions; and some are investor-owned. Ten major suppliers provide 85% of the area's water under the following institutional structures:

- Investor-owned systems:
  - Elizabeth Town Water Company
  - Hackensack Water Company
  - Commonwealth Water Company
  - Middlesex Water Company
- Municipal water systems:
  - City of Newark Water Supply Company
  - East Orange City Water Department
  - Jersey City Water Supply Company
- Water supply commissions serving several municipalities:
  - Morris County Municipal Utilities Authority
  - North Jersey District Water Supply Commission
  - Passaic Valley Water Commission

At the State government level the Department of Environmental Protection through the Division of Water Resources is the principal agency for water supply control and management.

The Division of Water Resources is responsible for:

- Water-quality management and protection
- Flood control and floodplain management
- The investigation and evaluation of surface and groundwater resources of the State
- The allocation of these resources in terms of their conservation, protection, planning, and equitable development
- Development and operation of major new water sources, such as Spruce Run-Round Valley

An Advisory Committee, composed of the chief engineers of the 10 major suppliers in the northeastern New Jersey area (listed above), has recently been established to review and participate in the development of the Division's water supply plans.

The Water Policy and Supply Council of the Division is composed of 11 laymen, appointed by the Governor, who conduct public hearings and render written decisions, subject to review by the courts, on the following matters:

- The allocation of water from natural surface and groundwater sources for public and private development

- The approval of water supply contracts between municipally and privately owned utilities
- The exercise of the right of eminent domain for the condemnation of lands and water rights for the development of new or additional sources by public water supply systems
- The allocation of water for sale from State-owned water supply facilities
- The question of equity involved in the construction of structures and encroachments on streams
- The delineation of floodplain hazard areas

Legal

The State (through the Water Policy and Supply Council) has regulatory control by means of quasi-judicial proceedings over all large new uses of water to assure equitable allocation to present and future interests and areas and to meet present and future needs. The water of the State is considered public, and the State alone is empowered to allocate water in the interest of the general public.

The State adheres to the riparian doctrine of common law as modified by court decisions in matters related to both surface water and groundwater. This includes the natural flow doctrine, which entitles anyone who owns land contiguous to a course of water to have equal right to the use of

that water without diminution or alteration. The riparian right does not include the right to merchandise water.

(4) Connecticut

Institutional

Private water companies play a predominant role in new source development and delivery. The more important private systems include:

- Bridgeport Hydraulic Company
- New Haven Water Company
- Connecticut Water Company
- Stamford Water Company
- Greenwich Water Company

There are two public regional systems formed by the State:

- Metropolitan District Commission (Hartford County)
- Southeastern Connecticut Water Authority (New London, Groton area)

State-level responsibility is entrusted to three departments and a special interagency planning board, in addition to a regulatory commission governing the private suppliers.

The Department of Environmental Protection (DEP) has taken over the responsibilities of the former Water Resources Commission and has statutory control over:

- Interstate transfers of water
- Flood-control work and establishment of channel encroachment lines
- Inspection of dams and marinas
- Control of dredging activities
- Allocation of Federal funds for sewerage facilities
- Pollution abatement

The Department of Health inspects water supplies in addition to studying public health aspects of new source development.

The Department of Finance and Control, Office of State Planning, is responsible for the preparation of State-wide plans for the management and development of water resources and has specialized knowledge of land use and related development issues.

The Public Utilities Commission (PUC) regulates the business operations and rate schedules of all private water suppliers within the State.

The Interagency Water Resources Planning Board (IWRPB) consists of representatives from the Department of Environmental Protection, the Department of Health, and the Department of Finance and Control (Office of State Planning). Since the Clean Water Act of 1967, the IWRPB has been responsible for statewide water resources planning. Its work is supported by a technical advisory group, with staff representation from each of the member agencies. It has recently formulated a Proposed Plan for Conservation and Development, which will be sent to the Governor and Legislature after a series of public hearings now underway have been completed.

Legal

Connecticut adheres to the doctrine of riparian rights evolved under common law and developed by court decisions.

The Department of Environmental Protection and the Department of Health are responsible for the enforcement of various statutes.

* * * *

This section has summarized the existing legal and institutional arrangements for developing and managing water supply resources. The following section discusses the objectives to be met by any alternative to these arrangements and assesses the advantages and disadvantages of several alternatives.

2. OBJECTIVES OF INSTITUTIONAL ARRANGEMENTS

The IPA report identified several objectives to be met by effective institutional arrangement options. We have reviewed these objectives and restated the rationale for the following six objectives, in order to reflect clearly our basis for accepting these objectives.

(1) Comprehensiveness of Planning and Decision Making With Respect to Resource Uses

- Agencies responsible for water resource planning should have a multipurpose perspective.
- When technological alternatives are available for tapping resources, several means of obtaining and distributing water should be considered in terms of varying environmental opportunity costs and benefits.
- Water supply development can be adapted to flood control, irrigation, navigation, hydroelectric power, recreation, conservation, and environmental quality.

(2) Responsiveness to Various Interests and Groups in Society

- Projects can be blocked by frustrated interest groups whose rights to object are not properly heard in an orderly process.

- The equitable resolution of disagreements between source and service areas and of disputes over allocation of favored sources among different regions and municipalities must recognize competing interests of conservation, recreation, and water consumption.

(3) Adequate Geographic Scope

- The geographic area should be sufficiently large to encompass both source and service areas in order to provide an adequate forum for resolving source-service area disputes.

- Economies of scale can be realized when an agency has a jurisdiction sufficiently large to make efficient use of a major source.

(4) Technical Capacity for Planning, Engineering, and Economic Analysis

- Comprehensive water management depends on strong technical and specialized personnel capable of analyzing economic, political, engineering, hydrological, and ecological matters.

- Even small local agencies need a strong inhouse capability; the work of qualified consultants alone is not enough.

(5) Adequate Financial Capacity

- Adequate finances are essential to faster decision making and realization of needed projects.
- Adequate finances provide capability to develop more effective management techniques.

(6) Political and Legal Feasibility

- Realistic feasibility expedites the acceptance of plans and hastens the implementation process.
- Realistic feasibility heightens the ability of an organization to gain acceptance from, and work with, other parties concerned with water management, including state governors, legislatures, planning bodies, municipalities, private firms, and citizens' groups.

* * * *

This section has presented the objectives to be achieved by effective institutional arrangements. The following section presents institutional options for water supply development and management and assesses the advantages of each with respect to the objectives.

3. INSTITUTIONAL OPTIONS

The IPA report identified five major institutional options and illustrative cost-sharing arrangements that encompass a full range

of alternatives for centralization/decentralization of control and financing. The five options are:

- Local Initiative/Federal Planning--A continuation of present institutional arrangements and trends
- Strengthened Systems of Local Initiative--Regional water supply councils established on the base of major metropolitan systems
- State/Federal Leadership--Federal planning and state construction and management of major new water supply sources (wholesale only)
- Federal Initiative--Federal planning, construction, and management of new water supply sources (wholesale only)
- Intergovernmental Water Resources Corporation--Corporation established by the three states to manage wholesale water supply development and operation for the entire area

The options range from decentralized control and financing (as represented by the Local Initiative/Federal Planning option) to a highly centralized option represented by the Intergovernmental Water Resources Corporation. The options are presented essentially as in the IPA report. Some options have been modified, however--particularly the State/Federal Leadership option--to illustrate a more workable method of operation.

The following sections present the major institutional elements of each option and our assessment of the advantages and disadvantages of each option with respect to the objectives outlined above. It should

be noted that the specific features of each option described are intended to be illustrative rather than necessary requirements of each option. The advantages and disadvantages identified indicate our assessment of the advantages and disadvantages that would result if the options were implemented as described.

The possible cost-sharing arrangements identified by IPA are also included. It should be noted that the cost-sharing elements are meant to be purely illustrative, as are the institutional options. Our review and evaluation of major cost-sharing options is presented in Chapter II of this report.

(1) Option 1: Local Initiative/Federal Planning

Institutional Elements: Option 1

- Local Role
  - Planning, construction, operation, and maintenance of production and distribution systems are included.
- State Role
  - Role involves regulating functions, such as approving rates, monitoring quality, and approving allocation of resources.
  - Drought of 1960s and environmental concerns have brought reorganization of state agencies to provide improved statewide management and increased attention to planning.

- Some development and operation of water supply resources are also included.

• Federal Role

- Flood control and reclamation
- Navigation
- Water resource planning
- Reimbursement for some water supply construction
- Water-quality guidelines

Cost-Sharing Elements: Option 1

• Local Role

- Revenue and general obligation bonds for construction
- User charges to pay amortization and interest on revenue bonds and to pay system and maintenance expenses
- Taxes to repay general obligation bonds, if not fully covered by revenues

• State Role

- Most northeastern states have not provided significant financial assistance for water supply development.

• Federal Role

- The water supply component of Federal construction projects has been fully reimbursable by the beneficiary states, localities, and basin commissions to the Federal Government.

Advantages and Disadvantages: Option 1

- Advantages

  - Decision making is highly responsive to various interest groups.

  - Some existing large metropolitan water supply agencies have the technical capacity for planning, engineering, and economic analysis.

  - Although some large metropolitan areas have limited capability for advance funding, they do have adequate capability to fund currently required projects.

  - The alternative is politically and legally feasible.

- Disadvantages

  - Geographic scope of all suppliers does not include both source and service areas and thus has limited capability to deal with these conflicts.

  - Limited mechanisms to resolve conflicts have restricted the ability to make timely decisions on new sources of supply.

  - Planning has tended to focus on single-purpose use of water supply and not to deal with multi-purpose and multi-means issues.

  - Small local units have limited technical and financial capability necessary to develop new sources.

(2) Option 2: Strengthened Systems of Local Initiative

Institutional Elements: Option 2

- Local Role

  - Regional water supply councils would be established on base of major metropolitan systems in conjunction with state government to supervise city-based regional suppliers and to absorb and consolidate small local suppliers where necessary.

  - Regional councils would directly own the small local suppliers that would have been absorbed; city-based regional suppliers, however, would continue to hold their own assets and have majority representation on a regional council.

  - Councils would include representatives of state, city, and county governments, major regional operating agencies, and water utilities supplying water in the region; appropriate Federal regional offices would have liaison representatives to serve as advisers.

  - Regional councils would develop water resource projects and submit them to the state for review and approval.

- State Role

  - Develop master multiple-purpose water resource plan

  - Exercise present state powers including control over allocation of water resources, regulatory power over water-quality standards, and technical and financial assistance to induce compliance with plan

- Federal Role

  - Continually evaluate adequacy of local systems, identify additional requirements to meet future needs, and formulate contingency plans

  - Establish Water Resource Research Institute to study water resource technologies and provide technical assistance to state and local levels

Cost-Sharing Elements: Option 2

- Local Role

  - Planning councils finance self-supporting operations through revenue bonds and user charges.

- State Role

  - Grants for planning site acquisition and non-revenue-producing activities, including added costs of environmental, recreational, and other concerns

  - Programs of technical assistance to improve local management

  - Participation in negotiation of interstate project agreements

- Federal Role

  - Technical assistance and funding of added costs of programs specifically designed to meet recreation, ecological, water supply, and other needs

  - Low-cost loans with variable reimbursements schedules to induce compliance with Federal priorities

- Limited participation in interstate projects

Advantages and Disadvantages: Option 2

- Advantages

  - This option induces more comprehensive planning with state and Federal funding of purposes other than water supply use.

  - This option provides flexibility with respect to geographic scope. Regional councils can range in size from metropolitan areas to the states themselves.

  - This option provides opportunity for greater technical capacity in regions presently outside major metropolitan areas.

  - This option provides potentially adequate financial capability.

- Disadvantages

  - This option would require the establishment of an additional layer of government, with changes in local roles and responsibilities, and thus involve some political difficulty in implementation. Bondholders would insist that regional council have full power to tax.

  - Although geographic scope could be made sufficiently broad to include both source and service areas, the regional council would be an untested and uncertain arena for resolving conflicts (between source-service, environment-water supply, and recreation and health interests).

- Meaningful operational criteria for evaluating compliance of proposed projects with plans have not been developed. Projects at the state level would continue to be evaluated in terms of their political and operational feasibility on a case-by-case basis.

- Timeliness of decision making is not likely to be significantly improved. Projects will need political and operational approval at all three levels--regional council, state, and Federal.

(3) Option 3: State/Federal Leadership

Institutional Elements: Option 3

. Local Role

- Local public and private distribution systems continue to operate present supply capability and retailing function.

. State Role

- Establish a division of water policy and supply within the environmental or natural resource department that would:

  . Develop and implement regional supply projects and wholesale to existing distributors

  . Provide liaison representative to intergovernmental planning committee

  . Approve specified developments by existing local systems

- Manage intergovernmental coordination function to update and confirm plans and to negotiate initial agreements for construction, cost sharing, and technical services and to participate in the development of bi-state activities as established to manage interstate projects

- Negotiate interstate agreements

- Hold local public hearings prior to approval of specified plans

- Establish a government line agency to manage supply sources--either directly for intrastate projects or as part of an interstate agreement on interstate projects.

- Establish a council in each state to direct water supply development by the line agency. The council could include:

  - Director of the state water supply agency

  - A representative of the local water supply utilities

  - A representative of the state's municipal environmental commissions

  - A representative of the state's municipal planners

  - A representative of the Governor

  Representatives of the local water supply utilities, environmental commissions, and municipal planners would be selected by the Governor from six candidates nominated by appropriate organizations representing each of the three groups. Interstate projects would be directed jointly by the councils of the states involved.

- Federal Role

  - The NEWS planning group would continue to do areawide planning and provide for liaison representation by state water supply planners. This group would, as part of its planning activities, exercise discretionary control over the amount of Federal funding, if any, to be provided for projects proposed by the states.

  - The Federal Government would provide technical assistance, funding support, and direct participation in interstate agreements.

Cost-Sharing Elements: Option 3

- Local Role

  - Development and financing of local systems

  - Payment to Federal Government and states, through taxes and user charges, of costs of construction and operation and maintenance of facilities funded by Federal Government or states

- State Role

  - Finance construction expenses through state general obligation or revenue bond issues

  - Recover operation and maintenance costs through user charges from operators of local systems

- Federal Role

  - Offer grants and loans to state agencies tied to specific standards for program design, management, and evaluation

- Provide supplemental, advance funding for purchase of land and "catastrophe" insurance capacity for projects in accord with areawide plans

- Provide financial grants and technical assistance for demonstration projects where sought by local governments

- Fund intergovernmental water planning groups

Advantages and Disadvantages: Option 3

- Advantages

  - Is compatible with both continuation of local control over distribution and existing supply utilities and expansion of state and Federal roles as needed to develop new sources of supply

  - Provides basis for comprehensive planning analysis and a political arena within which to resolve issues between environmentalists, recreation interests, water suppliers, and others

  - Provides strong state departments with definitive plans that could facilitate intergovernmental relations for participation in basin commissions and interstate agreements

  - Has adequate jurisdiction to realize economies of scale through new developments and through interconnecting local systems

  - Provides technical capacity for planning, engineering and economic analysis, adequate financial capability, and political and local feasibility to develop the state-level responsibilities

- Disadvantages

  - Does not encompass major interstate basins

  - May be difficult for states to take over water supply role that had been a local responsibility

  - Requires dealing with each interstate project separately to obtain joint state-Federal agreements

(4) Option 4: Federal Initiative

Institutional Elements: Option 4

- Local and State Roles

  - Appoint staff from state and municipal agencies to meet regularly with Corps of Engineers planning group to develop guidelines, review plans, and identify projects ready for detailed planning

  - Operate facilities after construction, if desired and agreed to by Federal Government

  - Select advisory committees to represent source and service, residents, and conservation groups in reviewing draft plans and project design

- Federal Role

  - Construction and management of Federal water supply projects are included.

  - Corps of Engineers establishes permanent water supply planning group for major metropolitan areas.

  - Corps accomplishes environmental evaluations and coordination with agencies and groups concerned with environmental plans.

- Corps will operate facilities only when user jurisdictions and state cannot agree on an alternative.

- Corps obtains concurrence with plans from state and local jurisdictions. Water Resources Council reviews all major plans prior to submission to Congress.

- Water Resources Council periodically appraises developments with respect to concepts of multiple objectives, multiple purposes, and multiple means and report findings to Congress and Governors of states involved.

- Corps establishes center for research and development in water supply management.

Cost-Sharing Elements: Option 4

- Local and State Roles

  - Review and approval of proposed plans

  - Revenue bonding and user charges to finance portion of construction and cover portions of operating and maintenance costs

- Federal Role

  - Construct water supply projects as authorized under P.L. 89-298

  - Sufficient discounting of reimbursement to induce agreement by state and local authorities

  - Augmenting of state and local staff budgets for water resources planning

  - Federal grants toward local share comparable to those available in other Federal programs

Advantages and Disadvantages: Option 4

- Advantages

  - This alternative offers major resources and *motivation to begin prompt development of* new sources.

  - This alternative provides adequate geographic scope, technical capabilities for planning, engineering, and economic analysis, and extensive financial capability.

  - Although a Federal construction agency is not likely to have as broad a reach of related functions as a state environmental affairs department, for example, planning requirements can include considerations of pollution abatement, waste disposal, and other services.

  - Weak representation of state and local interests can be mitigated by involving extensive participation of regional advisory committees in early stages of planning process.

- Disadvantages

  - Although Federal leadership can be particularly useful in raising the legal and political feasibility of projects and breaking stalemates, it requires obtaining creditable support from a wide range of public and private interests.

  - At this time, there is little support for the concept of the Corps' taking a direct construction and operating role.

(5) Option 5: Intergovernmental Water Resources Corporation

Institutional Elements: Option 5

- Local Role
  - Participation in regional planning councils to provide input to Corporation planning process
  - Representation on Corporation's Board of Directors
- State and Federal Roles
  - A Corporation with an independent legal, fiscal, and personnel system would be established.
  - The Corporation would plan, construct, and operate a water supply system to wholesale water to local retail distributors.
  - The Corporation's Board of Directors would include representatives of the Environmental Protection Agency (EPA), Corps, Department of Interior, governors and relevant department heads of affected states, executives of major cities, and executives of counties outside major cities.
  - Specified state and Federal water resource planning agencies, as well as Federal Water Resources Council, would review and approve all major development projects.

Cost-Sharing Elements: Option 5

- Local, State, and Federal Roles
  - Corporation would be self-funding through revenue bonds and user charges for all but

non-revenue-producing activities (such as river clean-ups).

- Annual operating deficits due to non-revenue-producing activities would be reimbursed by local, state, and Federal governments based on established percentages.

Advantages and Disadvantages: Option 5

. Advantages

- Powers and responsibilities assigned to the Corporation would include forecasting regional-local water use requirements.

- The Corporation would have adequate geographic scope, technical capacity for planning, engineering, and economic analysis, and financial responsibility.

- Freedom from legislative approval and popular referenda for bond issues could expedite decision making, but review by state and Federal authorities would likely involve comparable delays.

. Disadvantages

- The Corporation is likely to be divorced from general land and water resource planning and state and local expenditure priorities, but this tendency would be reduced by requiring any major development project to be approved by state and Federal authorities.

- Difficulty of passing interstate compact legislation is the major disadvantage of this alternative.

FINDINGS

The purpose of this analysis has been to identify options rather than develop final conclusions and recommendations. Based on our evaluation of the IPA report findings and the results of our interviews, however, we have identified the advantages and disadvantages of each option shown above. In reviewing the relative advantages and disadvantages of each of the options, particularly as related to political acceptability and probable effectiveness, the Local Initiative/Federal Planning and the State/Federal Leadership options would seem to be viable alternatives.

The Local Initiative/Federal Planning option needs to be considered because it does have a significant political acceptability and it is serving to develop new water supply resources, although in a rather uneven, "crisis" manner. Although it may not be as functionally effective as some of the other options, most of the other options have less political acceptability and thus less likelihood of implementation.

The second option, Strengthened Systems of Local Initiative, has a significant weakness with respect to political acceptability. It involves rearranging local water supply responsibilities, which are considered to be the clear prerogatives of local suppliers.

The fourth and fifth options, Federal Initiative and the Intergovernmental Water Resources Corporation, also involve significant political acceptability problems. Both of these options involve some reductions in present state responsibilities and the transfer of these responsibilities to an organization that overreaches the tri-state area. Each of the states is sufficiently concerned about maintaining control over its own water supply resources as to make implementation of either of these options highly unlikely as well.

The State/Federal Leadership option merits consideration for its viability. This option has the political acceptability advantage of not affecting either the responsibilities of local municipal utilities for distributing water (the problem of the Strengthened Systems of Local Initiative option) or the responsibilities of the states for water resource allocation and development (the problems of the Federal Initiative and Intergovernmental Water Resources Corporation options). This option does have, moreover, the significant advantage of providing a proven political forum for resolving the source-service area conflicts and environmental water supply issues that are major obstacles to current water supply development. The option involves a greater state role in water supply development than is presently the case in New York and Connecticut and thus may involve some political difficulty in implementation. Its advantages in dealing with

the source-service area and environmental-water supply issues, however, make it a second option of consideration.

4. IMPLEMENTATION REQUIREMENTS FOR EACH OF THE SEVEN PROGRAMS

Based on our evaluation of the findings expressed in the IPA report and the seven engineering programs of the Joint Venture Report, certain legal and institutional arrangements appear to be required to implement each of the seven programs--regardless of the overall institutional and cost-sharing option employed. The following sections present a brief engineering summary of the program and our assessment of the probable legal and institutional implementation requirements that would have to be met for each of the programs in both the short and long terms.

(1) Program A

Program Summary: Program A

This program requires a minimum transfer of water between states in both the short and long terms. Needs are met primarily from intrastate sources.

- New Jersey
  - The State would initially draw from the Raritan River and Tocks Island Reservoir on the Delaware River. Development of groundwater in Southern New Jersey and

the delivery of Hudson River water from West Park through the Ramapo River to Wanaque Reservoir would meet the State's later needs. (Projects included are: R-1; R-3; SJ-1; P-6).

- New York

  - Suffolk County groundwater would initially supply Nassau County and New York City, thereby releasing the City's upstate supplies for other areas.

  - The Hudson River-Hyde Park System would carry the load after the year 2000. (Projects included are: LI-2a; HU-1.)

- Connecticut

  - The State would initially draw on the lower Housatonic River at Shelton or Lake Zoar, and no additional storage capacity would be needed.

  - Development of the upper Housatonic River with its construction of storage reservoirs would meet later needs. (Projects included are: HO-1; HO-2; C-1.)

Short-Term Requirements: Program A

- Legal

  - New York City, Nassau County, and Suffolk County would need to negotiate an agreement providing for the use of Suffolk groundwater by Nassau and New York City.

  - New York City, with the required approval of New York State, would need to amend New York City Administrative Code, Title K, Chapter 51 (Section 42.0) binding New York City to supply the eight upstate counties through which the New York City system's water flows.

- Institutional

  - New York State would need to sustain the present role of its Department of Environmental Conservation and other agencies to continue its regulatory functions of approving rates, monitoring quality, and approving allocation of resources and to meet its needs from internal sources.

  - New Jersey would need to maintain the present role of its Department of Environmental Protection, Division of Water Resources, and other agencies to meet its needs from intrastate sources and to continue its regulatory functions.

    - Since New Jersey's water will initially be drawn from the Tocks Island Reservoir on the Delaware River, in addition to the Raritan River, New Jersey would have to continue to work closely with the Delaware River Basin Commission (DRBC), of which it is a member, which will control the releases and wholesale rates of the Tocks Island water.

  - New Jersey and New York state line agencies would need to plan together to prepare for the higher level of cooperation needed when the Hudson River becomes the major supply source.

  - New York City, Nassau County, and Suffolk County would need to establish a water district to assure the steady flow of Suffolk groundwater to Nassau County and the City.

    - The district would resolve issues of rates, metering, and leakage repair.

    - It would plan for reduction in the Suffolk supply to New York City between the years 2000 and 2010, when the Hudson River-Hyde Park system will be operating.

- The Board of Governors of the NYC-Nassau-Suffolk Water District could be composed of the following (voting members):

  . The Mayor of New York City

  . The County Executive of Nassau

  . The County Executive of Suffolk

  The Board would be assisted by a qualified staff and a special operating group composed of:

  . Three elected representatives from each of the major supply companies in each county

  . Six Suffolk County and Nassau County representatives of recreation and environmental interests identified by the respective County Executives

  . A liaison officer from the State of New York, Department of Environmental Conservation, as designated by the Governor of New York

  The operating group would recommend policy guidelines and comment on proposed recommendations and action plans. The District would be established with the support of New York State, which controls water allocation and development rights.

- Connecticut would need to maintain the roles of its Department of Environmental Protection, Department of Health, Office of State Planning, Public Utilities Commission, and Interagency Water Resources Planning Board to assure that immediate water needs are met from intrastate sources.

Long-Term Requirements: Program A

- Legal
  - New York and New Jersey would need to negotiate an interstate agreement by 2020 for delivery of Hudson River water from West Park, New York, through Ramapo River to the Wanaque Reservoir (New Jersey).
- Institutional
  - New York and New Jersey would need to establish a special authority for the administration and management of their Hudson agreement and for development planning of the Hudson Basin; or New York would need to develop and manage the project and supply water to New Jersey under contract.
  - The New York-New Jersey Special Authority would be governed by (voting members):
    - The Governor of New York
    - The Governor of New Jersey
    - Representative of the Army Corps of Engineers (under some options)
    - Representatives of environmental and planning concerns (under some options)

(2) Program B

Program Summary: Program B

This program requires a considerable amount of interstate water transfer between New York and Connecticut. New

Jersey depends upon internal sources and Tocks Island in the short term but looks to interstate transfer from the Hudson River by 2020.

- New Jersey
  - The State would initially depend on the Raritan River and Southern New Jersey groundwater.
  - Upon completion of Tocks Island, the State could obtain an additional 300 mgd from the Delaware River.
  - By 2020 the Hudson River–Ramapo system would be necessary. (Projects included are: R-1; R-3; SJ-1; P-6.)
- New York
  - The State would obtain additional supply by impounding reservoirs on the upper Housatonic River.
  - Development of Suffolk County groundwater would follow.
  - The Hudson River-Hyde Park system would be completed before 2020. (Projects included are: HO-1; HO-4; C-1.)

Short-Term Requirements: Program B

- Legal
  - New York and Connecticut would need to negotiate an interstate agreement for impoundment of reservoirs on the upper Housatonic.

- Nassau and Suffolk Counties would need to negotiate with water districts serving Monmouth, Middlesex, and part of Union Counties for supply of South Jersey groundwater.

- Institutional

  - The New York State Department of Environmental Conservation and Connecticut's Department of Environmental Protection, in cooperation with other relevant line agencies in both states, would need to manage terms for transfer of upper Housatonic River water to New York.

  - Nassau and Suffolk Counties would need to establish a water district to assure delivery of Suffolk groundwater to Nassau.

  - The same interests as presented in Program A for the Nassau-Suffolk water district would be represented here, with the exception of the Mayor of New York City.

  - New Jersey's Division of Water Resources would need to oversee delivery of South Jersey groundwater to Monmouth, Middlesex, and Union County water districts in accordance with the agreements.

Long-Term Requirements: Program B

- Legal

  - New Jersey and the Delaware River Basin Commission would need to agree by 2010 on New Jersey's withdrawal and release requirements for Tocks Island-Delaware River.

- New York and New Jersey would need to negotiate an interstate agreement on the Hudson River-Ramapo system by 2020.

. Institutional

- New York and Connecticut would need to sustain the short-term institutional arrangement for New York-Connecticut transfer of upper Housatonic River water.

- Nassau and Suffolk Counties would need to maintain their water district.

- New York and New Jersey would need to establish a special authority to manage the Hudson River-Ramapo system and to perform development planning for the future of the Hudson River Basin; or they would need to agree for New York State to perform these functions and supply water to New Jersey under contract.

- The same interests as represented in Program A would compose the special authority to manage the Hudson River-Ramapo system.

(3) Program C

Program Summary: Program C

This program requires a great amount of interstate transfer of water from the Hudson River to New Jersey and Connecticut, especially by the year 2000 and thereafter.

. New Jersey

- The State would depend initially on the Raritan River and the Tocks Island Reservoir.

- New Jersey's unused share of the Tocks Island Reservoir would be released downstream to maintain Delaware River control, which would reduce the quantity of release water needed from the New York City system.

- The Hudson River-Ramapo system would be needed by 2000 and enlarged by 2020. (Projects included are: R-1; R-3; P-6.)

• New York

- The City would rely on an 150-mgd-increase in yield from its Delaware River reservoirs, made possible by New Jersey's Tocks Island releases.

- The Hudson River-Hyde Park system would be needed by 2000 and later enlarged. (Projects included are: D-2; HU-1.)

• Connecticut

- The State's initial needs would be met from the lower Housatonic River with no additional reservoirs needed.

- Later needs would be met by connections to the Hudson River-Hyde Park system through the Kensico Reservoir and the Connecticut River. (Projects included are: HO-1; HM-1; C-1.)

Short-Term Requirements: Program C

• Legal

- New Jersey and the Delaware River Basin Commission would need to reach agreement on Tocks Island withdrawals and releases.

- New York and the Delaware River Basin Commission would need to reach agreement on Tocks Island withdrawals and releases.

- Institutional

  - New York and New Jersey would need to have their appropriate state line agencies negotiate and manage Tocks Island agreements with the Delaware River Basin Commission.

  - Connecticut would need to maintain functions of its various state line agencies to meet needs from intrastate sources.

Long-Term Requirements: Program C

- Legal

  - New York and New Jersey would need to negotiate an interstate agreement for the Hudson River-Ramapo project.

  - New York and Connecticut would need to negotiate an interstate agreement for the Hudson River-Hyde Park project.

- Institutional

  - New York, New Jersey, and Connecticut would need to establish a tri-state special authority to manage the terms of the compact for delivery of the Hudson River-Ramapo project water supply to New Jersey and the Hudson River-Hyde Park supply through the Kensico Reservoir to Connecticut. Alternatively, the three states could agree to New York's development of the project and supplying water to New Jersey and Connecticut under contract.

  - The tri-state authority required for the implementation of this program would be governed by (voting members):

    - The Governor of New York

    - The Governor of New Jersey

- The Governor of Connecticut
- The Secretary of the Interior (appointed by the President of the United States and a possible voting member)
- The Corps of Engineers (under some options)
- Environmental and planning representatives of each state

(4) Program D

Program Summary

This program requires a very large amount of interstate transfer of water between New York and New Jersey and New York and Connecticut in both the short and long terms.

- New Jersey
  - The State would depend initially on the Raritan River and additional yield from Two Bridges Reservoir.
  - By 2000, New Jersey would receive a 230-mgd supply from New York City's system, and the Two Bridges yield would increase from 50 to 100 mgd.
  - By 2020, New Jersey would receive 300 mgd from the New York City system and 350 mgd from the Hudson River-Hyde Park system. (Projects included are: P-1; R-1; D-2; HU-1.)

- New York

  - Initially, New York would rely on an additional 150-mgd yield from the Delaware River-Tocks Island controls.

  - Eventually the load will be shifted to the Hudson River-Hyde Park system. (Projects included are: D-2; HU-1.)

- Connecticut

  - The State will draw initially from Tocks Island releases and New York City system through Kensico Reservoir.

  - Later supply will be provided by the Hudson River-Hyde Park system and the Connecticut River. (Projects included are: D-2; HU-1; C-1)

Short-Term Requirements: Program D

- Legal

  - The State of New York would need to obtain approval of the Delaware River Basin Commission for the withdrawal of an additional 150 mgd from the Tocks Island Reservoir.

  - The states of New York and Connecticut would need to negotiate Connecticut's drawing Tocks Island water from Kensico Reservoir.

- Institutional

  - The respective state line agencies would handle negotiations and mechanics of required transfers.

Long-Term Requirements: Program D

- Legal

  - New York, New Jersey, and Connecticut would need to negotiate a tri-state agreement governing withdrawals from the Hudson River-Hyde Park system, which is central to this program.

- Institutional

  - New York, New Jersey, and Connecticut would need to establish a tri-state authority to deal with the pre-eminence of the Hudson River as a source of supply; or agree to New York management and supply under contract.

  - The tri-state authority required to implement this program would reflect those interests as in Program C and should be expanded to include representation for the Delaware River Basin Commission as a voting member. The Delaware River Basin Commission regulates the Tocks Island Reservoir that is vital to the water supply for each of the three states under Program D.

(5) Program E

Program Summary: Program E

This program requires a considerable amount of interstate water transfer between New York and Connecticut in both the short and long terms. In the long term New Jersey would require a large amount of water from the Hudson River-Hyde Park project, having depended on intrastate sources and Tocks Island in the short term.

- New Jersey

  - The State draws immediately from the Raritan River and from additional yield of the New York City system made possible by the Tocks Island releases.

  - The Hudson River-Ramapo system would meet later needs. (Projects included are: D-2; R-1; P-6.)

- New York

  - The City depends initially on additional yield of Delaware River reservoirs made possible by Tocks Island releases.

  - The construction of upper Housatonic River reservoirs would meet expected needs in 2000.

  - The Hudson River-Hyde Park system would meet needs in 2020. (Projects included are: D-2; HO-4; HU-1.)

- Connecticut

  - The State would share with New York the benefit of Tocks Island releases and the upper Housatonic River development by 2000.

  - The Connecticut River would supply additional amounts needed in 2020. (Projects included are: D-2; HO-4; C-1.)

Short-Term Requirements: Program E

- Legal

  - New Jersey and the Delaware River Basin Commission would need to negotiate the use of additional yield from the New York City system's releases at Tocks Island.

- New York and the Delaware River Basin Commission would need to agree on Tocks Island release requirements.

- New York and Connecticut would need to negotiate an agreement for Connecticut's sharing Tocks Island release benefits.

. Institutional

- The appropriate state line agencies of New York, New Jersey, and Connecticut would need to negotiate agreements for Tocks Island releases with the DRBC and handle the necessary transfers of water.

- These same state line agencies would have to work toward higher level of cooperation needed for the future.

Long-Term Requirements: Program E

. Legal

- New York and New Jersey would need to negotiate an agreement for the Hudson River-Ramapo system.

- Connecticut and New York would need to negotiate an agreement for the development of the upper Housatonic system.

. Institutional

- New York and New Jersey would need to establish an authority to manage the Hudson River-Ramapo system; or agree to New York management and supply under contract. The New York-New Jersey authority required to implement this program would have the same Board of Governors as that for the New York-New Jersey authority described in Program A.

- Connecticut and New York would need to establish an authority for management of the upper Housatonic system; or agree to New York management and supply under contract. The New York-Connecticut authority would represent interests similar to the New York-New Jersey authority.

(6) Program F

Program Summary: Program F

This program requires a very large amount of interstate water transfer for all three states in both the short and long terms. (This is the only program that does not require the construction of the Tocks Island Reservoir.)

- New Jersey
  - The State depends on the Raritan River and also on flood-skimming from the Delaware at Frenchtown, with storage in the Spruce Run-Round Valley Reservoir.
  - The Hudson River-Hyde Park system would provide additional supply by 2000 through a tunnel connecting with the New York City system. (Projects included are: R-1; HU-1; R-4.)
- New York
  - The City would depend on the Hudson River-Hyde Park system for additional supply. (Projects included are: HU-1.)

- Connecticut

  - Connecticut would draw on the Hudson River-Hyde Park system through the Kensico Reservoir.

  - Additional water would be supplied by the Connecticut River in 2020. (Projects included are: HU-1; C-1.)

Short-Term Requirements: Program F

- Legal

  - New Jersey and the Delaware River Basin Commission would need to agree on Delaware River flood-skimming.

  - New York, New Jersey, and Connecticut would need to negotiate a tri-state agreement for the management of the Hudson River-Hyde Park system by 2000 to supply all three states.

- Institutional

  - The appropriate New Jersey state line agency would need to negotiate with the Delaware River Basin Commission on flood-skimming.

  - New York, New Jersey, and Connecticut would need to establish an authority to manage the Hudson River-Hyde Park system; or agree to New York management and supply under contract. The Board of Governors of the interstate authority would be constituted as in Program C.

Long-Term Requirements: Program F

- Legal

  - Long-term legal requirements would continue to be met by earlier agreements (see above).

- Institutional

  - Long-term institutional requirements would continue to be met by the tri-state authority contractual arrangements established earlier to meet short-term needs.

(7) Program G

Program Summary: Program G

This program requires a massive transfer of water between New York and New Jersey by 2000 and thereafter. Connecticut's needs are met solely from internal sources.

- New Jersey

  - The State initially draws on the Raritan River and the Tocks Island Reservoir. Its unused share of this water would be used for downstream Delaware River flow control, thereby reducing the amount of releases needed by the New York City system. This would result in a 150-mgd increase for New York City.

  - The Hudson River-West Park high-flow skimming project would meet demand in 2000 and 2020. (Projects included are: R-1; D-2; R-3; HU-6.)

- New York

  - The City would rely initially on 150-mgd increase from New Jersey's Tocks Island releases (see above).

  - The Hudson River-West Park high-flow skimming project would be built for 2000 and 2020. (Projects included are: D-2; HU-6.)

- Connecticut

  - The State's early supply needs would be met from the lower Housatonic River.

  - Later needs would be met from the upper Housatonic River development project including construction of storage reservoirs for 2000 and 2020. (Projects included are: HO-1; HO-2.)

Short-Term Requirements: Program G

- Legal

  - New Jersey and the Delaware River Basin Commission would need to agree on the amount of New Jersey's releases into the Delaware River for downstream supply.

  - New York and the Delaware River Basin Commission would need to agree on New York's decreased releases from its reservoirs for Delaware downstream control.

  - New York and New Jersey would need to negotiate an agreement for management of the Hudson River high-flow skimming project.

- Institutional

  - New York and New Jersey would need to establish a special authority to manage the Hudson River-West Park high-flow skimming project; or agree to New York development and supply under contract. The Board of Governors of the authority would be as prescribed for Program D, which includes a voting role for a representative of the Delaware River Basin Commission.

  - Connecticut's state line agencies would continue to deal with Connecticut's internal sources of supply.

Long-Term Requirements: Program G

- Legal

  - The groundwork for long-term needs was laid in short-term agreements and would suffice.

- Institutional

  - The institutional arrangements arrived at in the short term would meet long-term requirements.

5. ILLUSTRATIVE APPLICATION OF THE LOCAL INITIATIVE/FEDERAL PLANNING AND STATE/FEDERAL LEADERSHIP OPTIONS TO PROGRAM G

This section illustrates the modifications in the implementation requirements for Program G that would result from selection of either the Local Initiative/Federal Planning or State/Federal Leadership options. The options and programs have been discussed separately in the preceding two sections of this report; the purpose of this

section is to illustrate the differing impact of these options on the implementation requirements of a specific program.

(1) Application of the Local Initiative/Federal Planning Option to Program G

The programs are specific collections of water supply projects designed to meet the water supply needs of the New York metropolitan area through the year 2020. Program G assumes that the Tocks Island Reservoir would be completed by 1980 and that part of New Jersey's share would be used for downstream Delaware River control. Ultimately, the Hudson River high-flow skimming project would provide most of the water needed in the region. Connecticut's needs are met solely from internal sources.

Short-Term Requirements

- Institutional

  - New York's Department of Environmental Conservation and New Jersey's Department of Environmental Protection would jointly decide on the need to develop the Hudson River-West Park high-flow skimming project, based on review of Federal plans and their own planning activities.

- New York and New Jersey would establish an interstate agreement to fund jointly an Authority to construct and manage the interstate use of the project; or New Jersey would contract with New York to develop and manage the water supply.

- The Board of Directors for the Authority would be composed of voting representatives of the Governors of New York and New Jersey; liaison representation would be provided by the Corps of Engineers.

- The Authority would have the power to regulate water flows within design flow constraints, set rates, and wholesale water to local suppliers in each state.

- If the water is provided to New Jersey by New York under contract, the flow constraints and rate basis would be provided in the contract.

- The State line agencies of Connecticut would continue to deal with the State's internal sources of supply.

. Cost Sharing

- New York and New Jersey would fund construction through general obligation or revenue bonds.

- The Federal Government could consider cost sharing as part of plans approved under P.L. 89-298.

- Bond amortization would be paid for through state taxes prior to operation (period of about 12 years for high-flow skimming).

- Once operational, bond amortization and operating and maintenance costs would be recovered through user charges to water supply companies and agencies.

Long-Term Requirements

- Continued operation of short-term arrangements would meet long-term requirements.

(2) Application of the State/Federal Leaderhip Option to Program G

Short-Term Requirements

- Institutional

  - Under this option, the NEWS planning group, which would continue to be funded and staffed by the Corps with liaison representation by state water resource agencies, could identify that the high-flow skimming project was a major alternative.

  - State agencies would incorporate knowledge of Corps support for high-flow skimming into planning.

  - New York, New Jersey, and Corps representatives would negotiate an interstate agreement to jointly fund and establish an Authority to construct and manage the interstate use of the projects or establish a contract whereby New York would supply water to New Jersey under a long-term contract.

  - The Board of Directors for the Authority would be composed of a total of 10 voting

representatives of the water supply councils (or similar interests) of New York and New Jersey:

- Director of the state water supply service
- Representatives of the local water supply utilities
- Representatives of the states' municipal environmental commissions
- Representatives of the states' municipal planners
- Representatives of each Governor

The Board would also include voting representatives of the Corps of Engineers.

- The Authority's powers and Connecticut's institutional arrangements would not necessarily be any different from those established under the Local Initiative/Federal Planning option.

- Cost Sharing

  - New York and New Jersey would participate in funding construction through general obligation or revenue bonds.

  - The Federal Government would share in costs on a fully reimbursable basis in a manner similar to the 1958 Act for water supply features of a multi-purpose reservoir, or in other ways under the NEWS Act, which states that plans shall provide for appropriate financial participation by local interests.

  - Reimbursement to the Federal Government by state and local interests of capital, operating, and maintenance costs would be deferred until the water is actually needed to meet safe-yield requirements, and the costs would be recovered

over an appropriate period of time through user charges to water supply companies and agencies.

Long-Term Requirements

- Continued operation of short-term arrangements would meet long-term requirements.

II. COST-SHARING OPTIONS FOR FINANCING WATER SUPPLY DEVELOPMENT

II. COST-SHARING OPTIONS FOR FINANCING WATER SUPPLY DEVELOPMENT

This chapter presents a general rationale for cost sharing to be employed in implementing the water supply projects of the NEWS Study. The chapter is in seven parts as follows:

- Major cost-sharing objectives
- Historical approaches to water supply cost sharing
- The Federal share of water supply costs: options
- Sharing water supply costs among jurisdictions other than the Federal Government
- Cost-sharing options
- Probable results of the cost-sharing options in today's environment
- Application of cost-sharing options to Program G (modified)

The primary focus of this chapter is on the type and amounts of cost sharing, for water supply costs, that would be most effective in implementing the NEWS projects. Development of a complete

rationale for sharing the costs of multi-objective projects involves significant problems in allocating the costs of these projects to the objectives.*

- No suitable indexes exist for measuring non-quantitative benefits, such as environmental quality.
- Weights to relate the value of an incremental unit of environmental quality, for example, to the value of an incremental unit of regional development do not exist.

Rather than expend our effort on these problems, we have concentrated, as requested, on identifying the types and levels of cost sharing, for water supply costs, that are likely to be most effective in implementing the NEWS projects.

1. MAJOR COST-SHARING OBJECTIVES

Four principal objectives have guided our development of a cost-sharing rationale:

(1) Adequate Water Supplies to Meet Projected Needs Should Be Developed on a Timely Basis

- The primary objective of the NEWS legislation is to assure adequate water supplies.**

*Federal Cost-Sharing Policies for Water Resources, National Bureau of Standards, Department of Commerce, April 1972, p. 75.

**Public Law 89-298, Title I, Northeastern United States Water Supply, October 27, 1965.

- The NEWS Study has projected needs and designed programs to meet these needs.

- Any acceptable cost-sharing rationale should promote timely implementation of these programs.

(2) The Federal Share of Program Implementation Costs Should Be Adequate to Assure Program Implementation

- Previous legislation and present needs justify acceptance by the Federal Government of some share of program implementation costs.

  - Several legislative enactments (identified below) have provided for limited Federal support of water supply development in the past.

  - Regional water supply needs are exceeding state and local governments' ability (financial and/or political) to fund water supply projects.

  - Any Federal participation should provide sufficient incentive to assure water supply development.

- Traditional approaches to water supply development and current Federal policy directions suggest, however, that the Federal share be only that necessary to assure water supply development.

  - Water supply development is presently an area of local and state initiative.

  - New Federalism suggests a decreasing Federal role in local projects.

(3) Water Supply Costs Not Borne by the Federal Government Should Be Shared Among Beneficiaries, Insofar As Possible, in Proportion to Benefits Received

- Cost sharing in proportion to benefits received has become an increasingly accepted general principle in public projects.

- To the extent beneficiaries (present and future) can be identified and benefits to each over the project life can be quantified, cost sharing in proportion to benefits received is both equitable and logical.

(4) Proposed Cost-Sharing Alternatives Should Be Politically Acceptable to All Participating Jurisdictions

- Although this objective is implied in the first objective "To Insure Timely Development," it is important to recognize that political acceptability is an important requirement apart from the considerations of logic and equity implied in the third objective.

- With respect to the cost-sharing rationale necessary to implement the programs, political acceptability becomes even more important.

2. HISTORICAL APPROACHES TO WATER SUPPLY COST SHARING

A number of different approaches to interjurisdictional water supply cost sharing have evolved over the past few decades.

(1) Local Benefiting Jurisdictions Have Historically Shared Among Themselves the Major Costs of Water Supply Development and Full Operating Costs

- The Wanaque Reservoir in New Jersey, for example, was constructed in the 1920's and financed by the eight benefiting municipalities. The claim of these municipalities on the water supply today is in proportion to their initial participation in the construction costs.

- Sharing of development and operating costs among benefiting jurisdictions has generally adhered to the principle of apportioning costs in proportion to benefits.

- Operating costs of the Wanaque Reservoir are apportioned to the using utilities in proportion to actual use, subject to a minimum of the quantity contracted for.

(2) Federal Sharing of Water Supply Development Cost Is Based on Several Previous Legislative Enactments Relative to Water Supply

- The Water Supply Act of 1958 authorized the Corps of Engineers and the Bureau of Reclamation to accept water storage as an acceptable use for funding purposes in design and funding of navigation, flood control, irrigation, and multi-purpose projects.

- The 1959 Housing Act Amendment provided capital construction loans to states and municipalities.

- The 1961 Amendments to the Water Supply Act of 1958 authorized the Corps and the Bureau of Reclamation to include additional capacity, in order to insure against future water demand, in reservoirs principally built for other purposes.

- The Public Works--Rivers and Harbors--Act of 1965 recognized that assuring adequate water supply had become a problem "of such magnitude" that they "require the Federal Government to assist in the solution."

- The Water Resources Planning Act of 1965 authorized Federal river basin planning studies.

- The Housing and Urban Development Act of 1965, as amended, authorized grants not to exceed 50% of total project costs for basic water supply facilities.

- The Public Works and Economic Development Act of 1965 provided for water facility grants in areas of economic distress and for regional commissions to plan economic development activities in multi-state regions.

(3) The Federal Share of Project Costs for Water Supply Has Included Several Alternate Forms

- Direct assumption of all project costs (1961 amendments to 1958 Water Supply Act)

- Grants covering a portion of total costs (1965 Housing and Urban Development Act)

- Interest-free, below-market-interest, and delayed-repayment loans (1958 Water Supply Act)

- Nonsubsidized direct Federal loans, which may nonetheless represent a subsidy to borrowing jurisdictions that might otherwise have difficulty in borrowing to meet project costs, particularly at relatively favorable Federal interest rates (1959 Housing Act Amendments)

- Technical and planning assistance by several Federal agencies

3. THE FEDERAL SHARE OF WATER SUPPLY COSTS: OPTIONS

The following section discusses the alternative types of costs to be shared (planning costs, construction costs, and others), the rationale for Federal sharing of these costs, alternative forms of cost sharing (loans and grants), and the advantages and disadvantages of each.

(1) Types of Costs To Be Shared

Five types of costs are considered: planning costs, site acquisition costs, construction costs, financing costs, and operating and maintenance costs. The following points discuss the rationale for Federal sharing of these costs.

- Planning costs
  - These costs serve as an incentive to subsequent implementing steps.
  - These costs promote orderly and economic development of water resources.
  - These costs are relatively inexpensive.
- Site acquisition costs
- Construction costs
  - These costs encourage timely construction.

- Construction costs are large, however; and, unless substantially reimbursed, funding of these costs is contrary to a corollary of the third objective--the principle that costs should be allocated to specific beneficiaries where possible.

. Financing costs

- These costs encourage timely construction.

- These costs reduce project cost through better borrowing capability of the Federal Government.

- Unless substantially reimbursed, funding of these costs is also contrary to the principle that costs should be allocated to specific beneficiaries where possible.

. Operating and maintenance costs

- No historical precedent exists for Federal sharing of water supply facility operating and maintenance costs unless a direct benefit to the nation is shown.

- Operating and maintenance costs are directly related to specific present users or potential users.

(2) Forms of Cost Sharing

Three forms of cost sharing are considered: loans, loan guarantees (a form of grant), and outright grants. The following points discuss the advantages and disadvantages of each:

. Loans

- Advantages

  - Loans may be made to a participating jurisdiction for all or a portion of specified costs.

  - Loan rates are flexible; rates may be at market or below market level to reflect better borrowing capability of the Federal Government.

  - Repayment periods are flexible; periods may range from a relatively short specified period of time to a long specified period of time or to an intermediate period of time (conditioned on a point in time when certain conditions are met, e.g., facility in full or partial use).

  - Specific loan characteristics can be adjusted as required to meet the four objectives states at the beginning of this chapter.

  - Loans involve minimal Federal expenditure.

- Disadvantages

  - Loans may not provide sufficient financial inducement to assure project or program implementation.

- Loan guarantees

  - Loan guarantees involve Federal guarantee of borrowing repayment by a lesser jurisdiction.

  - Although no precedent exists for the Federal Government to guarantee repayment of state borrowings, it would be, in effect, a low-cost form of grant (cost of risk). Ample precedent exists for Federal grants to states.

- Advantages

  - Does not require outlay of significant Federal funds

- Disadvantages

  - Limits loan repayment terms and conditions to those available in the commercial loan market

  - Requires the borrowing jurisdiction to assume immediate responsibility for the loan

  - May not be sufficient financial inducement to assure project or program implementation

- Grants

  - Advantages

    - Grants may be made to participating jurisdictions for all or a portion of specified costs.

    - Grants of (for example) 50% of construction costs may be provided for projects that meet the basic NEWS objectives.

    - Similarly, grants of up to, say, 75% of construction costs may be provided for projects that meet needs in addition to water supply.

    - Grants provide maximum financial inducement for project implementation.

  - Disadvantages

    - This form involves potentially large Federal responsibility for water supply costs.

- This form conflicts with the principle of allocating costs to specific beneficiaries where possible.

- Even a full grant may not be a sufficient financial inducement to participate in projects unwanted by state and local agencies.

4. SHARING WATER SUPPLY COSTS AMONG JURISDICTIONS OTHER THAN THE FEDERAL GOVERNMENT

This section presents two basic methods of sharing water supply costs and discusses the advantages and disadvantages of each.

(1) Design Flow

- Description--The concept of this alternative is that costs are borne by water supply users (individuals or representative jurisdictions) in proportion to their share of the initially estimated capacity requirements.

- Advantage--This method provides an equitable way of allocating the construction costs that are incurred as a result of the initial estimates of capacity required.

- Disadvantage--This method does not provide an equitable sharing of the costs that vary with usage, e.g., operating and maintenance costs, which may over time be significantly different from a given user's share of total usage estimated at the time the project is constructed.

(2) Volumetric Flow

- Description--The concept of this alternative is that costs are borne by water supply users

(individuals or representative jurisdictions) in proportion to actual use.

- Advantage--This method provides an equitable basis for allocating costs that vary in proportion to use, e.g., operating and maintenance costs.

- Disadvantage--This method does not provide an equitable basis for allocating costs incurred that do not vary with actual use, e.g., the initial construction costs.

These methods of cost allocation are essentially proportionate use of facilities methods. Design flow is on a projected use of facilities basis; volumetric is on an actual-use basis. The methods are comparable to the Corps' approved "Use of Facilities Method" and the Delaware River Basin Commission's "Proportionate Use of Facilities Method."

5. COST-SHARING OPTIONS

This section presents three major cost-sharing options, which flow out of the discussion of alternative types and forms of cost sharing in the preceding sections. The cost-sharing options do not represent all possibilities; an essentially endless array of options could be developed through consideration of minor differences. The three major options presented deserve to be considered in the context of NEWS objectives:

- Continuation of present cost-sharing arrangements with the modification of including Federal loans for strictly water supply purposes

- Continuation of present cost-sharing arrangements, as above, with the further modification of eliminating the requirements for states or local interests to commit to contract for the water and repay the project costs within the life of the project, but including specified conditions for reimbursement based on use

- Provision of Federal grants for planning, local purchase, and construction

The following sections present these options and assess the advantages and disadvantages of each with respect to the objectives identified at the beginning of this chapter. The options are presented within the framework of the Local Initiative/Federal Planning option and the State/Federal Leadership option. The Strengthened Systems of Local Initiative, Federal Initiative, and Intergovernmental Water Resources Corporation options would differ primarily in the entity responsible for receiving funds, constructing the projects, and repaying any loans.

Option 1: Continuation of Present Cost-Sharing Arrangements With the Modification of Including Federal Loans for Strictly Water Supply Purposes

- Description

  - The option provides for Federal sharing of strictly water supply development costs by amending the 1958 Water Supply

Act* to remove the limitation that only 30% of the costs can be allocated to future water supply purposes.

- The option includes sharing of capital costs for future water supply purposes among the state beneficiaries in accordance with "design flow" and sharing of operating and maintenance costs on a "volumetric" basis.

. Advantages

- This option removes a major restriction, by removing the 30% limitation, in the usefulness of the 1958 Water Supply Act for water supply development purposes.

- It is also likely to encounter the least opposition at the Federal level because it is a relatively straightforward extension of existing legislation.

- This option, with the payback provisions of the 1958 Water Supply Act, is relatively inexpensive for the Federal Government.

*Cost sharing of water supply costs provided in 1958 Water Supply Act: "...30 percentum of the total estimated cost of any project may be allocated to anticipated future demands where states or local interests give reasonable assurances that they will contract for the use of storage for anticipated future demands within a period of time which will permit paying out the costs allocated to water supply within the life of the project. And provided further, that the entire amount of the construction costs, including interest during construction, allocated to water supply shall be repaid within the life of the project but in no event to exceed fifty years after the project is first used for the storage of water for water supply purposes, except that (1) no payment need be made with respect to storage for future water supply until such supply is first used, and (2) no interest shall be charged on such cost until such supply is first used, but in no case shall the interest-free period exceed ten years..."

- The cost-sharing provisions are in accord with general cost-sharing practices.

- Water supply costs are borne by beneficiaries.

• Disadvantages

- The major disadvantage of this option lies in the payback provisions that require the states and, in turn, the local municipalities and water supply utilities to commit to begin paying the interest after 10 years and to repay the entire construction costs within 50 years of first usage or at least during the life of the project.

- Local municipalities and water utilities often find it politically difficult to vote money now for facilities that will not be needed for 10 to 20 years.

- The requirement for advance commitments now--despite detailed and thorough plans that indicate a need will exist and that the project will pay for itself through user charges whether the commitments are honored or not--is proving to be a significant factor holding back water supply development.

Option 2: Continuation of Present Cost-Sharing Arrangements, As in Option 1, with Elimination of the Requirement for Advance Commitments by States or Local Interests to Contract for the Water

• Description

- In addition to removing the 30% limitation, this option would also remove the requirement that states or local interests provide advance commitments to contract for the water and pay for the project within the life of the project.

- In this option, the money would be lent to the states to construct and operate water supply facilities that the states and Corps jointly agree are required to meet projected water supply needs.

- The Corps would have discretionary power over the percentage of total project costs to be lent. The Corps could require some nominal percentage of costs, such as 10%, to be funded by the state(s) as evidence of their commitment without affecting the overall desirability of this option.

- The key element of this option is that the Federal Government becomes, in effect, an "insurer." Unlike the previous option, where the state and local water utilities agree to pay for the water supply whether it is used or not, under this option the Federal Government is reimbursed only as the water is used. The balance, the "insurance water," continues to be funded by the Federal Government.

- This option includes sharing of capital costs for future water supply purposes among the state beneficiaries in accordance with "design flow" and sharing of operating and maintenance costs on a "volumetric" basis.

- To ensure that the water supply is contracted for as needed to meet safe-yield requirements, rather than being paid for only as used in a severe drought, the state would require local water suppliers to contract and pay for the

water as necessary to meet any deficit between current demand and the safe yield of the water suppliers' existing sources.*

- The state would be required not to approve any competing water supply projects until reasonable assurance was provided that the project would be paid off.*

. Advantages

- This option removes the major restriction to water supply development by eliminating the requirement for advance commitments by states or local interests to pay for the total project costs.

- It provides the basis for the NEWS planning group (as outlined in the state/Federal option), once a definite need has been identified and plans have been developed to meet that need, to control the financial resources necessary to implement the plan and thus implement the plans in a timely and orderly manner.

- Water supply costs are borne by beneficiaries as the supply is drawn upon to meet safe-yield requirements.

. Disadvantages

- Under this option, the Federal Government is the "insurer" and carries the risk that

*These state responsibilities would be an extension of the responsibilities presently exercised by the New Jersey Water Policy and Supply Council. The Council requested the City of Newark to appear at a hearing on February 5, 1973, "concerning the apparent inability of the City of Newark to meet the current and increased demands for public water supply in the area dependent upon the Newark distribution system during an extended drought as severe as that which began in June, 1929" in order to "outline to the Council...how the City plans to obtain quantities of water...to safely sustain its current and near future demands...in the event of the recurrence of a prolonged drought."

the facilities constructed will provide for a greater water supply than is actually required.

- With this risk, it may be difficult to implement supporting legislation at the Federal level.

- Given that the plans are carefully developed, however, this risk should be small.

- If the planning assumptions are correct, the project should be fully utilized within a period of 15 to 20 years and paid off within a period of 50 years.

Option 3: Federal Grants for Planning, Local Purchase, and Construction

. Description

- State or state-approved subordinate jurisdictions bear all project operating costs.

- Federal grants to states or state-approved subordinate jurisdictions covering, say, 50% of project planning and construction costs, provided proposed projects are consistent with NEWS specifications.

- This option also involves sharing of capital costs not covered by Federal grants among state beneficiaries in accordance with "design flow" and sharing of operating and maintenance costs volumetrically.

. Advantages

- Federal grants provide a maximum financial inducement to states to develop water supply resources.

- Fifty-percent grants for planning are consistent with the maximum grant size stipulated in the Water Resources Planning Act of 1965.

- Fifty-percent grants for construction are consistent with Section 702 of the Housing and Urban Development Act of 1965, which provides assistance for the development of water and sewer facilities.

- Disadvantages

  - This option is unlikely to be politically acceptable at the Federal level, particularly in light of current Federal priorities of either the Administration or the Congress.

  - Grants may be unnecessary. That is, this inducement for project implementation may not be significantly greater than that of the uncommitted loans, which will, in all likelihood, involve substantially less cost.

  - Grants will also reduce the extent to which costs are borne by beneficiaries.

This section has assessed the advantages and disadvantages of each of the major options with respect to the objectives identified in the first section of this chapter. Over time, the relative importance of the advantages and disadvantages identified for each of the options will vary. In times of drought or impending drought, for example, the mere availability of loans for water supply purposes will likely be sufficient to induce water supply development. In other cases, the availability of 100% grants may not be sufficient to induce water supply development. Recognizing these factors,

the following section assesses the likely effectiveness of each of the options in today's environment.

6. PROBABLE RESULTS OF THE COST-SHARING OPTIONS IN TODAY'S ENVIRONMENT

The preceding sections of this chapter have dealt with development of cost-sharing rationale options that incorporate considerations of logic, equity, and political feasibility. The purpose of this section is to review the probable effectiveness of these options in dealing with possible cost-sharing related water supply problems and issues in each state. As will be shown, in some cases (such as development of intrastate sources) the uncommitted loans are likely to be as effective as the full grant. In other cases (such as joint New York/New Jersey development of the Hudson), even a full grant will likely not be sufficient to induce development of the project. In these latter cases, means other than cost sharing will be required to ensure development.

This section presents first a summary description of the financing-related water supply problems in each of the three states. The remainder of this section then assesses the likely effectiveness of each of the cost-sharing options in dealing with each state's water supply financing problems.

(1) The Three States Have Significantly Different Water Supply Financing Problems

The different problems need to be considered in evaluating the overall effectiveness of the general cost-sharing approaches.

Connecticut

- The State, in its Plan for Conservation and Development, has identified several sites within the State that have strong potential of being developed as water supply areas to meet projected needs.

- The private companies within the State, which have traditionally been the major developers of new sources, have been precluded by the Public Utilities Commission (PUC) from building into their rate structures costs for land acquisition for future development and use.

- The State has not yet completely determined the actual cost of its proposed land acquisition program but, whatever the cost, it is unlikely that the State Legislature would see fit to commit the State to meet all the costs involved in light of other pressing public needs.

New Jersey

- The Spruce Run-Round Valley Reservoir has been constructed under the 1958 Water Supply Bond Act. Problems have developed, however, with the State's attempts to get the use of the water fully committed. Although several utilities were interested in the water supply in the planning stage, as the reservoir was completed and as the utilities realized the cost was to be substantially

higher than current costs, some utilities backed out. The State presently is saddled with what some consider a "white elephant," a reservoir of 190-mgd capacity that is only utilized on a 80-mgd basis. As a result, any further projects are likely to require 100% firm commitments by local, municipal, and private water supply utilities prior to actual construction.

- A major transmission line was recently proposed that would have drawn on the "excess" capacity of the Spruce Run-Round Valley Reservoir to supply the needs of additional utilities in the northern New Jersey area. As a basis for obtaining final State approval, local water suppliers committed themselves to approximately 90% of the costs. Since the costs were not fully committed, however, the project was eventually dropped.

New York/NYC

- There is little question of the need for additional water supply for New York City, and the City is prepared financially to undertake new source development on its own, as in the past. Unlike the Spruce Run-Round Valley Reservoir in New Jersey, which is not fully utilized because the private utilities will not commit themselves to the need for its water, any new source for New York City would be used almost immediately.

- New York has no interest whatsoever at this time in sharing the potential supply of the Hudson River with other users. There is a strong belief that New Jersey and Connecticut have enough water to meet their own needs and that New York is the major problem area.

- State officials do not foresee New Yorkers' sharing their right to develop the Hudson River Valley with anyone from another state; there is not enough similarity in the situation with the Delaware River

to induce one to conclude that there will be a similar development pattern on the Hudson.

(2) Elimination of the Thirty-Percent Restriction Should Improve the Effectiveness of Present Cost-Sharing Arrangements (Option 1)

Connecticut

- The State's bonding power is virtually untested in the area of water supply development, since the private investor-owned companies have been the developers in the past.
- The State, however, is unlikely to commit all the funds necessary to meet future water supply needs in face of other current needs.
- The availability of 100% water supply loans will improve the State's ability to finance strictly water supply projects.

New Jersey

- Present cost-sharing arrangements include requirements for commitments to 100% of capacity prior to beginning construction.
- With difficulties in selling local municipalities on the need for meeting water supply needs 15 or 20 years in the future, present arrangements in New Jersey are likely to involve uneven, "crisis" construction rather than orderly development of resources to meet long-term needs.
- The availability of 100% water supply loans will improve the State's ability to finance strictly water supply projects, however.

New York

- New York State at this time foresees having the capability to offer a bond issue to cover costs for any essential source development it might undertake, if the Governor and the people of the State expressed desire for such a project through a referendum.

- New York City remains interested in providing its own capital for its own projects rather than entering into any entangling relationships with Federal assistance at this time.

- New York City is currently constructing a major new distribution system (Tunnel 3) within the City, which will cost more than $1 billion when completed. This project is being financed out of general city revenues approved by the Board of Estimate.

- The availability of 100% water supply loans will have a minimal effect on New York City's ability to finance water supply projects.

(3) The Availability of 100% Uncommitted Loans (Option 2) Should Further Improve the States' Abilities to Finance Water Supply Projects

Uncommitted loans are similar to the loans in Option 1. The major difference is that these loans will not require the states and local municipalities to commit in advance to pay for the total project. The Federal Government becomes, in effect, the insurer.

Connecticut

- The uncommitted loan would allow the State to undertake its proposed land acquisition program and to reserve the identified sites for future development.

- The uncommitted loan should be effective in water supply development in Connecticut.

New Jersey

- The availability of uncommitted loans, to be repaid as the water is used, will eliminate the need for advance commitments by local utilities to 100% of a proposed project capacity.

- Uncommitted loans appear sufficient to permit orderly and timely development of water supply resources in New Jersey.

New York/NYC

- New York State would not rule out the utility of uncommitted loans but is reluctant to accept Federal assistance, which always has requirements attached. The availability of uncommitted loans in New York is not likely to speed its water supply development.

(4) Federal Grants (Option 3) Appear Unlikely to Be Significantly More Effective than the Uncommitted Loans in Inducing Water Supply Development

Connecticut

- There is no evidence that an outright total Federal grant would be more acceptable than the uncommitted loan.
- State officials believe that a loan would allow the State to retain a larger say in how its resources are to be developed and allocated.

New Jersey

- The availability of full Federal grants for water supply development appears unlikely to improve significantly the timeliness or orderliness of water supply development as compared to the uncommitted loans.
- Full Federal grants would appear to offer greater likelihood that specific Corps-planned projects will be developed, but this greater likelihood is small compared to the selective approval of individual projects for uncommitted loans.

New York/NYC

- It is unlikely that a full Federal grant system would induce New York or New York City to enter into any joint interstate projects.

- In light of the State and the City's capacity to raise funds for major natural resource projects, it is unlikely that either would be interested in full grants for intrastate projects where Federal requirements and direction would be attached.

* * * *

In today's environment, even a full grant option is not likely to affect New York State/New York City decision making. In New Jersey and Connecticut, however, the elimination of the 30% restriction on water supply costs and the uncommitted loan options, in addition to meeting the minimum Federal financial role objective, appear to offer significant potential for inducing more timely and orderly water supply development as well.

The following section applies the "elimination of 30% restriction" (Option 1) and uncommitted loan options (Option 2) to a modified version of Program G.

7. APPLICATION OF COST-SHARING OPTIONS TO PROGRAM G (MODIFIED)

In this analysis we have modified the engineering features of Program G to include more profit variations, such as metering in New York City and the Long Island groundwater exchange, to illustrate the application of cost sharing to a full range of project types.

The application of current cost-sharing arrangements, modified to eliminate the 30% restriction, is shown in Exhibit II, following this page. As can be seen by an analysis of HU-6, the only project that serves more than one state, the added capital costs of each 20-year period are shared on the basis of the proportionate share of the added capacity. Total project costs by 20-year period are shown at the bottom of the exhibit. (These cost figures are derived in part by estimation and/or extrapolation and are indicative only, rather than definitive.)

The following table illustrates the calculation of each state's share of capital costs by estimating the 1980 costs for HU-6 to New Jersey and New York City.

State	Yield (mgd)	Capital Costs (in millions)
New Jersey	50	
New York City	150	
Total	200	$540

Based on projected demand, New Jersey's share of the total requirement is $\frac{50}{200}$ = 25%. New Jersey's share of the capital costs should be the same: 25% of $540 million = $135 million; New York City's share is the balance of $405. The 1980 HU-6 capital costs of $135 million for New Jersey and $405 million for New York are shown in the top half of the exhibit.

EXHIBIT II

Corps of Engineers
Department of the Army

COST-SHARING DESIGN FLOW PROGRAM G

Projects	Yield (mgd)			1980 Costs		2000 Costs		2020 Costs	
	1980	2000	2020	Capital (in millions)	Operating ($/mgd)	Capital (in millions)	Operating ($/mgd)	Capital (in millions)	Operating ($/mgd)
NEW JERSEY									
HU-6	50	30	450	135.0	314	(54.0)	314	277.3	222
R-1	70	70	70	20.1	141	-	141	-	141
R-3	-	300	300	-		208.1	175	-	175
Total New Jersey	120	400	820	155.1		154.1		277.3	
NEW YORK STATE									
HU-6	-	30	96			20.3	314	43.6	222
NEW YORK CITY									
HU-6	150	270	594	405.0	314	81.0	314	214.0	222
LIX*	-	50	50	-		68.0	266	-	266
Metering	50	100	100	100.0		-		-	
Total New York City/State	200	450	840	505.0		169.3		257.6	
CONNECTICUT									
HO-1	40	40	40	24.0	150	-	150	-	150
HO-2	-	60	200	-		67.5	242	11.6	242
Total Connecticut	40	100	240	24.0		67.5		11.6	
Total Project Capital Costs Per Period				684.1		390.9		546.5	
Total Project Capital Cost By Project									
HU-6				540.0		47.3		534.9	
R-1				20.1		-		-	
R-3				-		208.1		-	
L-1				-		68.0		-	
Metering				100.0		-		-	
HO-1				24.0		-		-	
HO-2				-		67.5		11.6	
TOTAL PROJECT CAPITAL COST PER PROJECT				684.1		390.9		546.5	

*Long Island groundwater exchange.

The volumetric costs are not calculated because they are based on actual usage. The key information on this cost is shown in the charge per mgd; the volumetric costs for any period would be calculated by multiplying the mgd charge by the number of mgd used in the period.

The figures shown in the exhibit also reflect the total costs of the uncommitted loan options to the states. In actual practice, the payback periods are likely to be somewhat different, with the uncommitted loan options likely to be repaid over a longer period of time. On a discounted cash flow basis, the present cost of the uncommitted loan options to the states would therefore be less expensive. Unless the payback period is substantially longer or the receipt of initial payments is significantly delayed, however, the costs of the two options are likely to be comparable.

III. OPTIONAL FEDERAL AND STATE GOVERNMENT ROLES IN ESTABLISHING INTERCONNECTIONS, LEAKAGE CONTROL, AND METERING

III. OPTIONAL FEDERAL AND STATE GOVERNMENT ROLES IN ESTABLISHING INTERCONNECTIONS, LEAKAGE CONTROL, AND METERING

This chapter discusses (1) the application of the Local Initiative/Federal Planning option and the State/Federal Leadership option to the issue of establishing interconnections and (2) leakage control and metering in terms of the Local Initiative/Federal Planning option and the State/Federal Leadership option.

The contents of these two sections are based on interviews in the three states and on secondary research of various existing reports on metering in New York City.

1. OPTIONAL FEDERAL AND STATE ROLES IN ESTABLISHING INTERCONNECTIONS

There is little controversy among professionals in the field over the value of interconnections among water systems in times of unusual need. In times other than periods of unusual need, however, local water supply utilities are reluctant to establish water connections and simply put money in the ground. Problems also arise when the interconnections are used, on the issue of cost sharing relative to the actual amount of water transferred. It is one matter to transfer the water from one

supplier to an adjacent supplier in which the borrower pays the lender's actual rates. It is another matter when water must be transferred through at least two points to an ultimate destination. In this case, a cost-accounting problem develops from the need to identify the utilities that are net users, those that are net suppliers, and those that are simply transfer agents and from the need to determine the net added costs to be paid by using utilities to adequately reimburse the supplying and transfer utilities.

(1) Local Initiative/Federal Planning Option

- Description
  - Municipal and private water supply companies bear the responsibility for establishing interconnections at the local level.
  - The result has been that interconnections are established on a one-to-one basis between the local systems in times of demonstrated need.
  - Water borrowed or transferred is reimbursed at the lending supplier's actual rate.
- Advantages
  - This option recognizes that such interconnections require a relatively short lead-time for construction--as little as a few weeks in emergencies.

- It also recognizes that the low costs of installation are reasonable capital expenditures for local suppliers.

- It provides a minimal level of system interconnections.

• Disadvantages

- Although installation costs are low, the local suppliers view establishing interconnections as an unproductive investment. In times other than emergencies, the investment is simply "money in the ground."

- This option does not provide the systematic and organized approach to the problem necessary to assure a complete system of interconnections to be used in emergencies.

- Transferring costs on a one-to-one basis makes water transfer across one or more utilities difficult even in times of emergency.

(2) State/Federal Leadership Option

• Description

- The state could assume responsibility for establishing interconnections for water supply projects and serve as an intermediary to negotiate a general transfer rate to be used by all utilities.

- State and Federal planning would identify the points where interconnections would be most beneficial.

- With expansion of cost sharing to include strictly water supply precincts, the Federal Government could provide funds for multiple interconnections.

- Advantages

  - This option promotes the development of an organized plan and heightens the likelihood of some insurance against natural or manmade disasters. This is achieved at relatively low cost to the Federal Government, and it spares the local supplier of a nonproductive expenditure that would probably not be made unless there were a demonstrated critical need.

- Disadvantages

  - This option involves the state and Federal agencies in many small construction projects that could be funded on a local basis, although in a less systematic manner.

2. OPTIONAL FEDERAL AND STATE ROLES IN LEAKAGE CONTROL AND METERING

Our interviews identified a possible state role in leakage control of establishing standards and monitoring utility leakage statistics. The primary significance of leakage control with respect to possible Federal roles, however, is tied to metering in New York City. Leakage control is therefore considered together with metering in this section.

Metering was identified as a issue during most interviews in New Jersey and New York State. Various studies have been done for more than half a century in an attempt to ascertain the potential usefulness of universal metering in inducing leakage

repair and lowering consumption in New York City, but questions still exist as to the consumption and leakage savings that would be realized. Many upstate New York jurisdictions with meters believe New York City should be metered, and metering is likely to be required to obtain the cooperation of these jurisdictions outside New York City in major water supply projects, unless the savings to be realized from metering can be demonstrated to be minimal.

(1) Local Initiative/Federal Planning Option

. Description

- Local water systems, both municipal and investor-owned, require metering of their consumers. The only major exception to this is New York City, which meters all industrial and commercial users and only approximately 20% of its domestic users.

- Various bills have been proposed to the City Council requiring some degree of metering, but they have never been voted on. Given increased pressure by the upstate counties to install metering as a basis for cooperation, however, New York City may eventually install metering itself.

. Advantage

- This option relies on New York City to pay for and install metering itself, as the other municipalities have done.

- Disadvantage

  - Continued delay by New York City in installing metering may delay construction of major water supply projects.

(2) State/Federal Leadership Option

- Description

  - The Federal Government could fund a demonstration project for metering a portion of New York City.

- Advantages

  - Such a project, well planned, directed, and controlled, could provide a definitive answer to the cost-benefit issue of metering.

  - A demonstration would involve less cost than complete, universal metering. It may indicate that full metering is not a cost-effective option and thus eliminate it as a basis for further delay of major water supply projects.

- Disadvantages

  - The project involves Federal funding of a project generally considered to be New York City's responsibility and not an appropriate use of Federal funds.

  - A demonstration project would not achieve much unless the City of New York agreed in advance to metering if the demonstration were to prove it to be cost-beneficial.

APPENDIX

LIST OF PERSONS INTERVIEWED

CONNECTICUT

Harold Ames, Assistant Director, Office of State Planning, Department of Finance and Control/Chairman, Interagency Water Resources Planning Board

Elliot Bronson, Senior Environmental Analyst, Natural Resources Center, Department of Environmental Protection

Zell Steever, Director, Water and Related Resources, Department of Environmental Protection

Robert Taylor, Director, Water Compliance and Hazardous Substances, Department of Environmental Protection

Hugo Thomas, Director, Natural Resources Center, Department of Environmental Protection

Richard Woodhull, Chief of Public Water Supply, Department of Health

NEW JERSEY

Daniel Berardinelli, Manager, Newark City Water Supply Company

James Dolan, Chief Engineer, City of Jersey City Water Department

Helen Fenske, Assistant to the Commissioner, Department of Environmental Protection, State of New Jersey

George M. Haskew, Jr., Vice President/Chief Engineer, Hackensack Water Company

Herbert A. Howlett, Chief Engineer, Delaware River Basin Commission

NEW JERSEY (continued)

Wendell R. Inhoffer, General Supervisor/Chief Engineer, Passaic Valley Water Commission

Dean C. Noll, Chief Engineer, North Jersey District Water Supply Commission

Charles M. Pike, Director, Division of Water Resources, Department of Environmental Protection, State of New Jersey

Chester Ring, Vice President of Operations, Elizabeth Town Water Company

James F. Wright, Executive Director, Delaware River Basin Commission

Alvin Zach, Director, Division of Engineering, City of Newark

NEW YORK STATE

David Allee, Acting Director, Water Resources and Maritime Sciences Center, Cornell University

Holt Bodinson, Director, Division of Public Education, Department of Environmental Conservation

David E. Buerle, Director, Management Studies and Analysis, Temporary State Commission on the Water Supply Needs of Southeastern New York

John C. Bumstead, Director, Bureau of Public Water Supply, Department of Health

Terrence Curran, Director, Office of Environmental Analysis, Department of Environmental Conservation

Gilbert M. Faustel, Chief of Design Section, Bureau of Public Water Supply, Department of Health

Robert Gerber, President, Spring Valley Water Company

Robert D. Hennigan, Executive Director, Temporary State Commission on the Water Supply Needs of Southeastern New York

NEW YORK STATE (continued)

Edward Karath, Assistant Director for Water Management Planning, Department of Environmental Conservation

Lee E. Koppelman, Director, Suffolk County Planning Department

W. Mason Lawrence, Deputy Commissioner, Department of Environmental Conservation

William Lee, Chief, Interstate Planning Section, Department of Environmental Conservation

Peter Ley, President, Jamaica Water Supply Company

Louis Mirando, Assistant Manager/Chief Engineer, Long Island Water Company

Paul A. Schulte, Senior Engineer, Bureau of Public Water Supply, Department of Health

Edwin Vopelak, Chief, Bureau of Water Regulation, Department of Environmental Conservation

Michael Zial, General Manager, Long Island Water Company

NEW YORK CITY

William G. Belli, Assistant Deputy Chief Engineer, Board of Water Supply

Samuel Gofseyeff, Engineer-In-Charge of Needs and Resources, Board of Water Supply

Abraham Groopman, Assistant Commissioner/Chief Engineer, Department of Water Resources, Environmental Protection Administration

Martin Hauptman, First Deputy Chief Engineer, Board of Water Supply

Edward C. Maguire, Executive Director, Board of Water Supply